





Renewable Energy Opportunities for Massachusetts Municipalities

Presented to:

Clean Energy for Towns and Schools: $ave Money and Go Green

May 18, 2007

Hyannis, MA

Massachusetts Renewable Energy Trust

Jim Christo, Program Director

MASSACHUSETTS TECHNOLOGY COLLABORATIVE

RENEWABLE ENERGY TRUST








MTC AND THE TRUST

- The Renewable Energy Trust (RET) was established to:
  - increase the supply & demand for electricity from clean sources, and
  - promote the development of a vibrant Massachusetts renewable energy industry.
- Massachusetts Technology Collaborative (MTC) selected to administer the Trust.

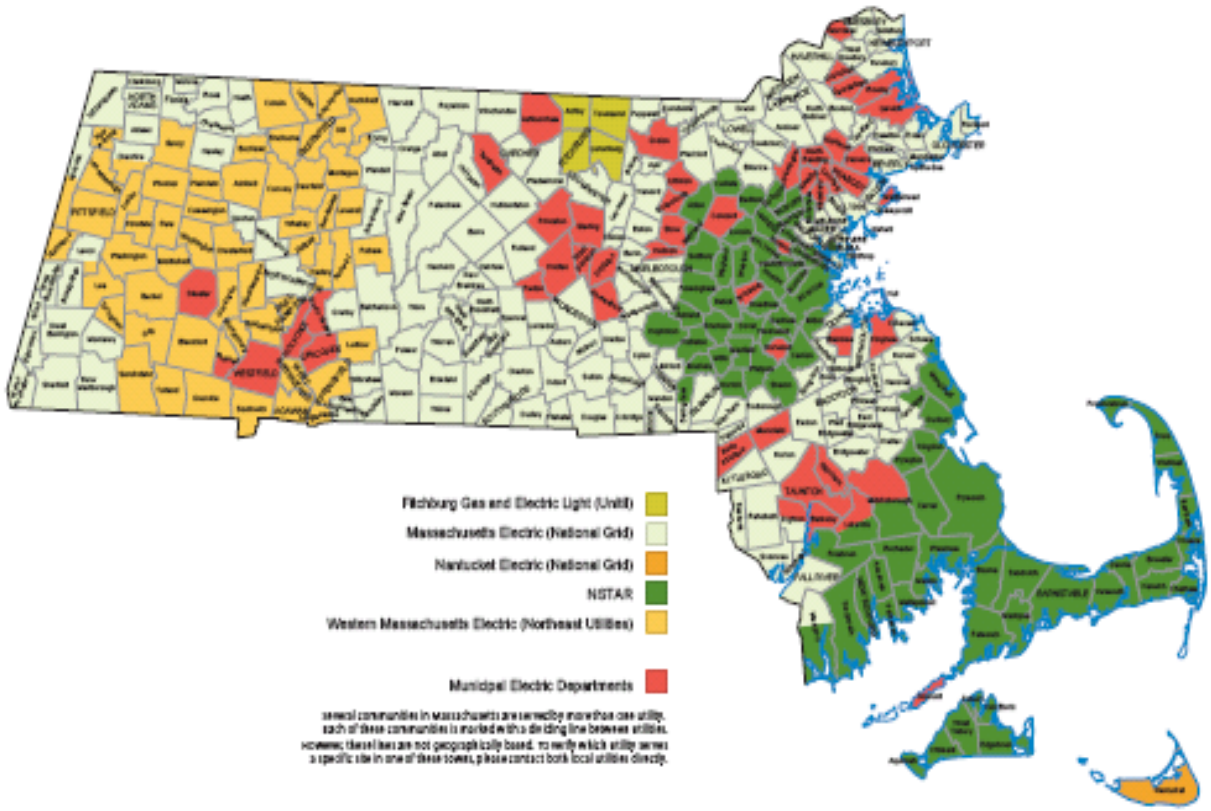







SOURCE OF FUNDS & ELIGIBLE LOCATIONS

- Source of funds is a surcharge → $25 million/yr
- Only customers in investor owned utility service territories:



MASSACHUSETTS TECHNOLOGY COLLABORATIVE

RENEWABLE ENERGY TRUST








Trust Accomplishments

- **800+ clean energy projects awarded**
  - 560+ installed so far
  - 10.5 MW Total
  - 4.0 MW Distributed Generation installed
- **Over $200 million in awards**
  - $44 MM in FY2006
  - Another 16MW of DG with installations pending
- **Over 150 cities and towns with installations**

ELIGIBLE RENEWABLE TECHNOLOGIES

Initiatives support commercially available technologies:

MASSACHUSETTS TECHNOLOGY COLLABORATIVE

RENEWABLE ENERGY TRUST








RENEWABLE DG MARKET OPPORTUNITIES & DRIVERS

Tech.	Technology Specific	General
Solar/PV	▪ Quick installation and easy integration ▪ 20+ year system design life, no moving parts ▪ Most universal technology ▪ MTC grant + Federal & State Tax Incentives = 4 to 7 year payback to biz	▪ Rising electricity prices ▪ Increasingly favorable Federal and State policy (could be better, e.g., net metering, etc.) ▪ State Incentives ▪ Greater public awareness and acceptance due to larger installed base of projects (places to kick the tires) ▪ RE becoming more mainstream ▪ Increasing energy efficiency focus ▪ Greater Green Building momentum for new construction
Wind	▪ Good wind, good load, and a good site = good DG wind project. How many are there in MA?	
Biomass CHP	▪ Potentially better ROI (based on design info) but fewer DG scale technologies available ▪ MA forest and lumber industry, agriculture sector eager to find new sources of revenue ▪ Growing biofuel infrastructure	
Hydro	▪ MA has 132 MW of undeveloped hydro capacity at 130 sites with existing dams, many with onsite loads (Idaho National Engineering Laboratory, U.S. DOE) ▪ Technologically straightforward but permitting intensive	








PV PROJECT ECONOMICS

Examples of PV Project Simple Paybacks		
	Existing Building	**Green Building**
Not for Profit	20+ years	~16 years
Public	15+ years	~12 years
Residential*	12+ years	~10 years
Taxable Business*	**~5 years**	**~4 years**

- In addition, under reasonable long-term financing terms, many PV projects can be **cash flow positive from day 1**
  - Energy Savings + REC revenue > Debt Service plus O&M
- Assumes MTC rebate based on project located in an Economic Target Area and incorporating MA-manufactured equipment
- *Assumes federal and state tax incentives

MASSACHUSETTS TECHNOLOGY COLLABORATIVE RENEWABLE ENERGY TRUST



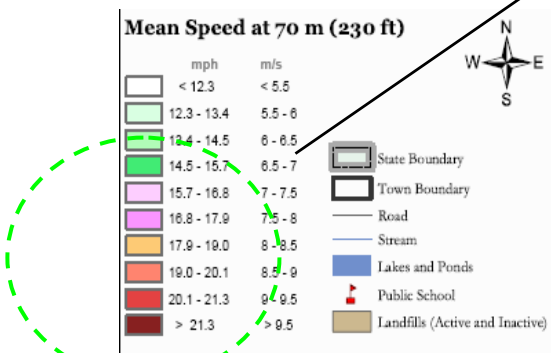


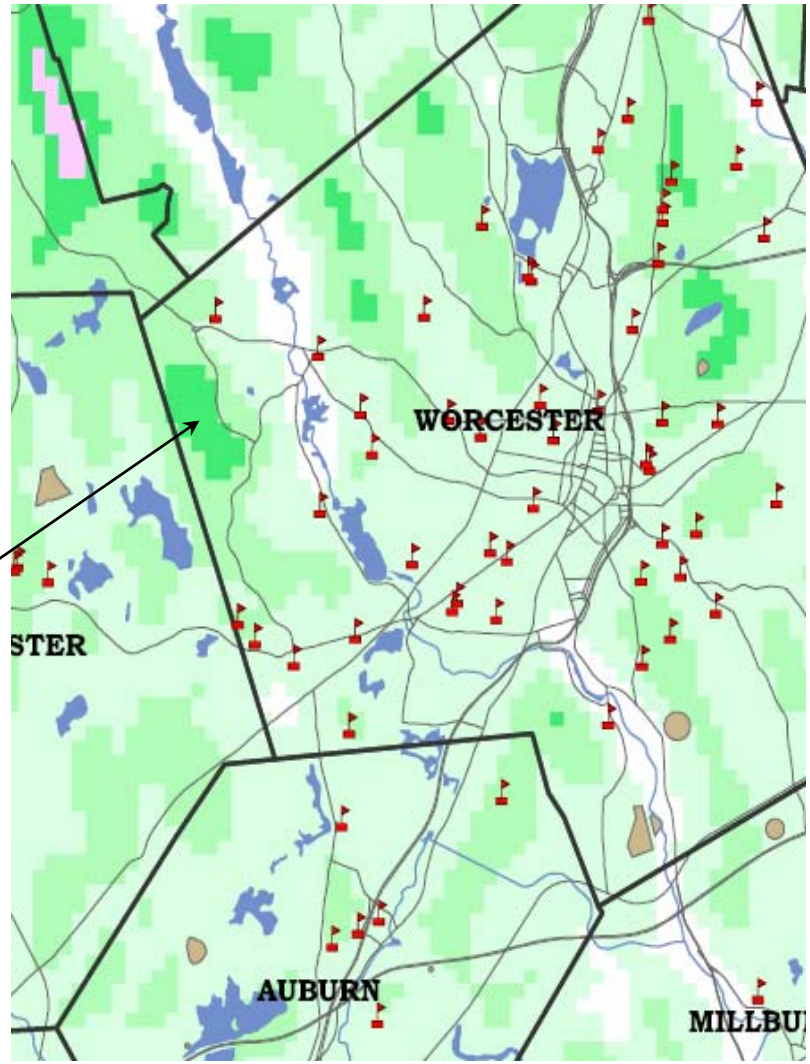



WIND PROJECT ECONOMICS

Basic wind project requirements:

- Good wind resource!!!
  http://truewind.teamcamelot.com/ne/
- Compatible site
  - Adequate space for turbine
  - Distance from neighbors
  - Sensitivity to views
- Compatible onsite electricity load (avoid full retail rate)
- Empowered project champion
- Good consultants





MASSACHUSETTS TECHNOLOGY COLLABORATIVE

RENEWABLE ENERGY TRUST








WIND PROJECT ECONOMICS

Rough Estimate of "Best Case" Simple Payback Period (Years) Based on Wind Resource (m/s at 70 meters)						
Turbine Capacity (kW)	**100 kW**	**250 kW**	**600 kW**	**850 kW**	**1500 kW**	**2500 kW**
Hub Height	**35 m**	**42 m**	**50 m**	**60 m**	**70 m**	**80 m**
5.5 m/s at 70 m	15	12	10	9	8	9
6.0 m/s	10	8	7	8	6	7
6.5 m/s	8	6	6	7	6	6
7.0 m/s	6	6	6	6	5	5
7.5 m/s	6	5	5	5	5	5

- In addition, under reasonable long-term financing terms, good wind projects can be **cash flow positive from day 1**
  - energy savings + REC revenue > debt service plus O&M
- Assumes MTC grants and federal & state tax incentives

MASSACHUSETTS TECHNOLOGY COLLABORATIVE

RENEWABLE ENERGY TRUST









What Does the MA Renewable Energy Trust have to offer Municipal RE Projects?

- Small Renewables Initiative
- Large Renewables Initiative
- Green Schools Initiative
- Clean Energy Choice
- Community Wind Collaborative








SMALL RENEWABLES INITIATIVE (=<10 kW)

- $3.6 million per year though FY2010
- Grants of up to $50,000 for design & construction
- Customer-sited renewable energy projects
  - Residential, small business, municipalities, institutions
- Rebates are monthly awards
  - Made on a first-come first-serve application process
- Actual award is based on the rebate matrix.
- Projects must meet minimum technical requirements
- *Application must include selected contractor – Pre-bid for municipalities*

www.masstech.org/rebates

MASSACHUSETTS TECHNOLOGY COLLABORATIVE RENEWABLE ENERGY TRUST

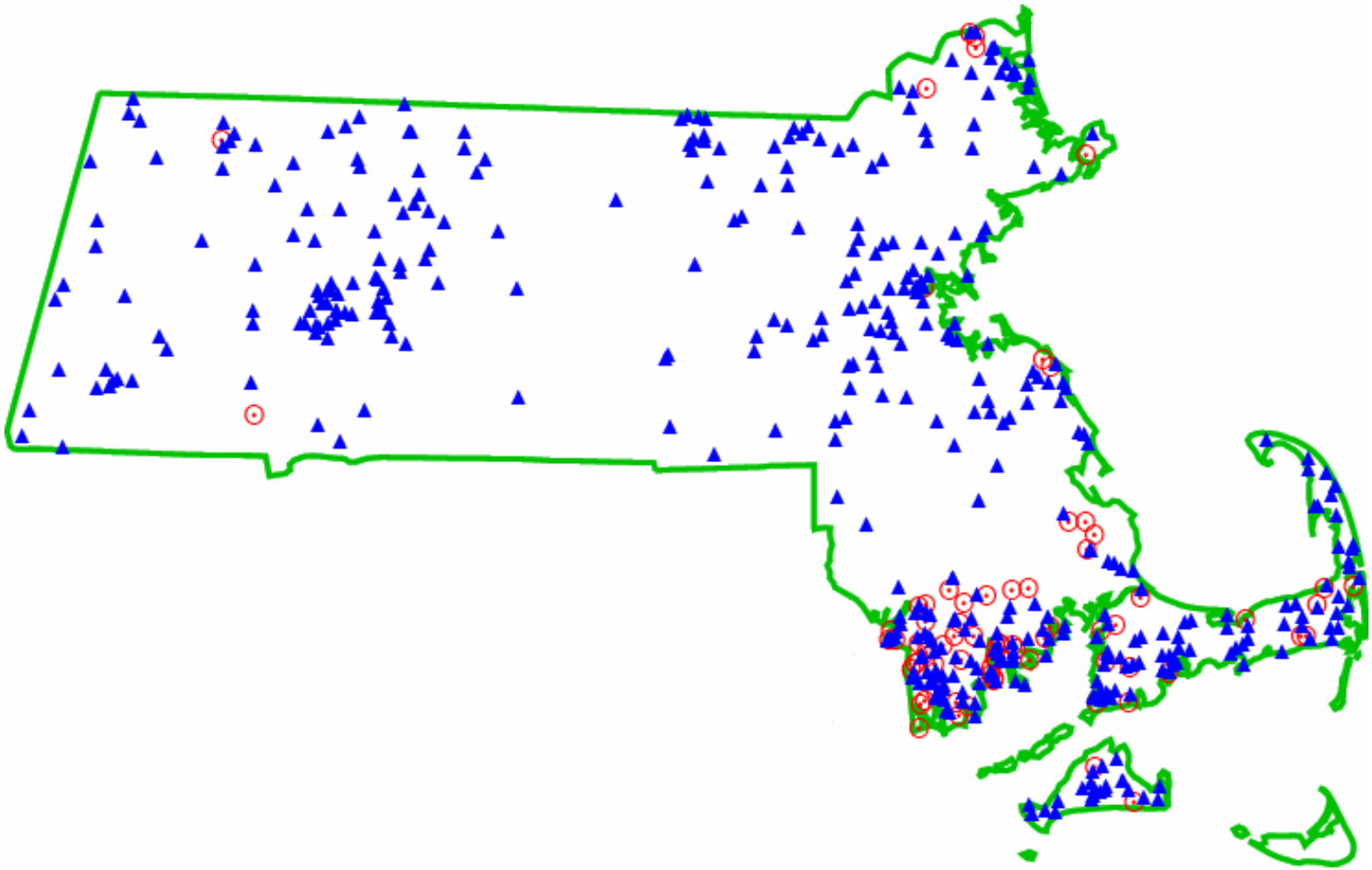







SMALL RENEWABLES INITIATIVE

SRI Projects through September 30, 2006



MASSACHUSETTS TECHNOLOGY COLLABORATIVE

RENEWABLE ENERGY TRUST









SMALL RENEWABLES INITIATIVE

SRI Rebate Matrix				
			Technology	
			PV	Wind	Hydro
Distributed Generation			($/watt dc)	($/watt ac)	($/watt ac)
		Base Incentive ($/watt)	$2.00	$2.25	$4.00
	PLUS: Additions to Base				
		MA-manufactured components	$0.25	N/A	$0.75
		Economic Target Area	$1.25	$1.25	$1.00
		Public Buildings	$1.50	$1.00	$2.00
		Building-Integrated PV	$1.00	N/A	N/A
	Affordable Housing				
		20% to less than 50% Low-income/ Affordable Housing (40-B), *or*	$1.00	$1.00	$1.00
		50% or greater Low-income/ Affordable Housing (40-B)	$2.50	$2.50	$2.50
	High Performance Buildings (for New Construction/ Major Rehab Only)				
		Green Buildings (LEED/CHPS), *or*	$1.00	$1.00	$1.00
		Advanced Buildings/ High Performance Homes (Energy Star)	$0.25	$0.25	$0.25









SMALL RENEWABLES INITIATIVE (=<10 kW)

Example of Public Project in ETA with MA Mfg product		
Total PV Cost Per Watt		$8.50
Project Size (Watts DC)		10,000
Initial Cost		**$85,000**
MTC Rebate		
Base Incentive ($2.00 per watt)	$	20,000
MA Manufactuered Components ($.25 per watt)	$	2,500
Economic Target Area ($1.25 per watt)	$	12,500
Public Building ($1.50 per watt)	$	15,000
Total ($5.00 per watt)	***$***	***50,000***
Cost After MTC Rebate	**$**	**35,000**

59% of Cost covered by MTC Rebate

MASSACHUSETTS TECHNOLOGY COLLABORATIVE RENEWABLE ENERGY TRUST








LARGE ONSITE RENEWABLES INITIATIVE (LORI)

- ~$7 million per year budget (pending approval)
- Competitive solicitation and evaluation process
- 2 Rounds per year
- Next due date: August 2007
- Public projects are eligible in addition to commercial, industrial, and institutional projects.

Project Type	Available Funding
Feasibility (Solar not eligible)	Capped at $40,000 requiring applicant cost-share of 15%
Design and Construction	• **D&C Award based on similar incentive matrix** • Design is capped at $100,000 or 75% of actual costs • Construction is capped at $400,000 or 75% of actual costs; • PV capped at $250,ooo








Green Schools Initiative - Pilot

First Phase of Green Schools

- 16 Pilot "Green" Schools
- Development of high-performance school standards for MA (MA Collaborative for High Performance Schools)
- Studies on cost-benefits of green construction and health and productivity benefits

MASSACHUSETTS TECHNOLOGY COLLABORATIVE

RENEWABLE ENERGY TRUST







Green Schools Initiative II

- New $15 Million Initiative
- Working with MA School Building Authority (MSBA)
- New schools or major renovations
- Educational Services
- Grants for Design Services
  - Engineering support
  - “Green team” support services
- Renewable Energy System Grants
  - For schools certified as MA High-Performance Green Schools









Clean Energy Choice Program - CEC

Program for customers to make voluntary, extra payments to purchase clean electricity for their homes/organizations

1. Support clean energy
   - Increase demand, then supply increases
2. Earn money for clean energy projects for your town or city
   - **MTC matches each $1**
3. Earn money for clean energy projects to benefit low-income assistance programs throughout Massachusetts.
   - **MTC matches each $1**

www.cleanenergychoice.org

MASSACHUSETTS TECHNOLOGY COLLABORATIVE

RENEWABLE ENERGY TRUST









Clean Energy Choice Program - CEC

Over **$1 million** awarded to 231 towns

Town	Total CEC Funds Earned Thru September 2006
Northampton	$ 95,217
Newton	$ 64,846
Worcester	$ 36,217
Great Barrington	$ 24,615
Williamstown	$ 21,311
Medford	$ 22,478
Shutesbury	$ 14,330

CEC$ + SRI Project = Free System

www.cleanenergychoice.org

MASSACHUSETTS TECHNOLOGY COLLABORATIVE

RENEWABLE ENERGY TRUST








COMMUNITY WIND COLLABORATIVE

1. Wind Turbine Site Survey

- Fatal Flaw Assessment of all sites in a municipality
- Need 13.4 mph wind at 70 meters
- Municipally owned/controlled land

2. Feasibility Study

- Need positive site survey
- 500kW to 5 MW project

3. Standard Financial Offer

- Renewable Energy Certificate (REC) Purchase Deal

MASSACHUSETTS TECHNOLOGY COLLABORATIVE

RENEWABLE ENERGY TRUST








Clean Energy Opportunities Pilot

- New resources to support municipalities
- Free Web Presentations:

May 31, 2007 at 10am

Is an Energy Service Company Right for You?

check website for details

MASSACHUSETTS TECHNOLOGY COLLABORATIVE

RENEWABLE ENERGY TRUST









FOR MORE INFORMATION...

www.masstech.org

- Small Renewables: masstech.org/**rebates**
- Large Renewables: masstech.org/**largeDG**
- Green Schools: masstech.org/**greenschools**

MASSACHUSETTS TECHNOLOGY COLLABORATIVE

RENEWABLE ENERGY TRUST